

## EXECUTIVE SUMMARY

In its *Notice of Proposed Rulemaking and Order* in this proceeding, the Commission solicits comment on a large number of issues.<sup>1</sup> This paper offers the Commission an analysis of a number of key economics issues that will shape the future use of the 37-40 GHz band and other spectrum bands as well. First, we consider whether and to what extent the Commission should impose limitations (a “cap”) on the amount of spectrum to be licensed to a single entity. Second, we consider the extent to which the Commission can and should rely on market forces to determine how the awarded spectrum should be used. Third, we assess the costs of the Commission’s proposal to “reclaim” any currently “idle” spectrum in the 39 GHz portion of the 37-40 GHz band.

Using the analytical framework developed by the Justice Department for assessing the competitive effects of mergers, the paper concludes that the Commission’s proposed cap of 600 MHz per market is far too stringent. Licensees in the 37-40 GHz band are likely to face considerable competition from entities holding licenses to other substitutable spectrum and from “wireline” providers, most notably the LECs. In a market environment dominated by the LECs, a spectrum cap will not promote competition. If the market is narrowed to include only spectrum-based services, a cap of even as high as 1.4 GHz is not likely to raise significant competitive concerns.

Because it appears that licensees in the 37-40 GHz band will be providing service in a vibrantly competitive market, licensees will have the incentive to use awarded spectrum in a way that maximizes their profits. Those licensees that serve the demands of end-users most efficiently will be the most profitable. Thus, the Commission need not impose buildout, technical, or use

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<sup>1</sup> See *Notice of Proposed Rulemaking and Order In the Matter of Amendment of the Commission’s Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands and Implementation of Section 309(j) of the Communications Act - Competitive Bidding, 37.0-38.6 GHz and 38.6-40.0 GHz*, ET Docket No. 95-183, RM-8553, and PP Docket No. 93-253 (Released December 15, 1995).

requirements on licensees to mandate the use of spectrum in the “public interest.” Indeed, such requirements would harm consumers by diminishing the ability of licensees to respond to rapidly changing demands and rapidly changing technology.

Finally, the Commission has proposed to reclaim and then auction “idle” spectrum from incumbent 39 GHz licensees who have not used their license awards “responsibly.” If adopted, this proposal would harm both consumers and the Commission. Consumers will be harmed because spectrum reclamation will reduce the profit incentives of entrepreneurs to find innovative uses for fallow or underutilized spectrum. The Commission will be harmed because fear of after-the-fact reclamation will reduce the amount prospective licensees are willing to bid for the spectrum in an auction.

## I. Introduction and Summary of Conclusions

In its *Notice of Proposed Rulemaking and Order* in this proceeding, the Commission solicits comment on a large number of issues.<sup>2</sup> This paper offers the Commission an analysis of a number of key economics issues that will shape the future use of the 37-40 GHz band and other spectrum bands as well. First, we consider whether and to what extent the Commission should impose limitations (a “cap”) on the amount of spectrum to be licensed to a single entity. Second, we consider the extent to which the Commission can and should rely on market forces to determine how the awarded spectrum should be used. Third, we assess the costs of the Commission’s proposal to “reclaim” any currently “idle” spectrum in the 39 GHz portion of the 37-40 GHz band.

In our analysis of each of these three issues, we seek to determine how the proposed policies will affect the efficiency of market outcomes, and what policies will promote efficient, competitive market outcomes. The following summarizes our conclusions on each of these issues.

First, a necessary prelude to an assessment of the need for and stringency of a spectrum cap is an assessment of the market context in which the 37-40 GHz licensees will be providing service. To this end, we rely on the paradigm used by the Justice Department to evaluate the competitive consequences of particular mergers. This paradigm describes the kind of market environments in which a merger could lead to higher prices for consumers.

The initial step in a standard horizontal merger analysis is to define the relevant product and geographic markets. Next, the paradigm is used to determine what suppliers should be counted as offering service in the markets so defined. Using that supplier list, one can then

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<sup>2</sup> See *Notice of Proposed Rulemaking and Order In the Matter of Amendment of the Commission’s Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands and Implementation of Section 309(j) of the Communications Act - Competitive Bidding, 37.0-38.6 GHz and 38.6-40.0 GHz*, ET Docket No. 95-183, RM-8553, and PP Docket No. 93-253 (Released December 15, 1995).

calculate market concentration among suppliers in the market. The more concentrated the market, the more likely it is that market suppliers can tacitly coordinate their pricing behavior; i.e., rivalry among firms in more concentrated markets may be less vigorous, thereby permitting these firms to charge prices that exceed competitive levels.

The Justice Department has specified concentration thresholds for merger analyses to classify markets as “moderately” or “highly” concentrated and, therefore, more or less conducive to tacit coordination as a result of the merger. However, implementation of the merger paradigm also requires the analyst to consider other factors (such as technological change and the cost structure of the market suppliers) that may enhance or diminish the likelihood of coordinated behavior for any given level of concentration. In addition, the Justice Department itself has noted that its concentration thresholds may be appropriate for merger analysis—which involves assessing a change in the market environment—but too stringent for evaluating the performance of the market itself. For this purpose, the Department has suggested that a considerably higher level of market concentration would be consistent with acceptable market performance.

In this paper, we have applied the merger paradigm to the licensing of the 37-40 GHz spectrum. While defining the relevant product market is difficult because there is currently very little experience with the kinds of services that could be provided with this spectrum, WinStar’s experience suggests that the spectrum could be used for a variety of services that are currently being provided by CAPs, LECs, and others. As a result, we have concluded that the 37-40 GHz band is highly unlikely to be a distinct relevant market for the analysis of competitive issues. The relevant product market very likely includes other “nearby” spectrum that likely could be used for similar services: the 18 and 23 GHz spectrum, the 28 GHz spectrum, and the spectrum above 40 GHz. This spectrum is either now available for substitutable services, or its licensing is currently being considered by the Commission. The relevant product market also likely includes similar services provided using fiber optic cable, twisted cable pairs, and coaxial cable.

Because the Commission has proposed the use of BTAs as the licensed service areas, our analysis provisionally uses the BTA as the smallest relevant geographic market.<sup>3</sup>

Against that background, we consider the effect of alternative spectrum caps on market concentration and conclude that caps substantially in excess of the Commission's proposed 600 MHz limit would be consistent with acceptable market performance. If the market includes the LECs, as seems likely, then in fact no spectrum cap is required to maintain market competitiveness. Licensees at 37-40 GHz will control only a small portion of market supply. Furthermore, for some time to come, the LEC is likely to so dominate the local exchange and access markets that all other suppliers will have little or no ability to affect market prices. Even if the relevant product market includes only spectrum-based alternatives, however, our analysis indicates that a spectrum cap as high as 1400 MHz still would leave market concentration within the "moderate" range. We also conclude that a myriad of other factors, including technological and regulatory change, further reduce the likelihood that the absence of a stringent spectrum cap will lead to coordinated pricing behavior by the suppliers in the relevant market. For similar reasons, we conclude that the Commission's definition of an "attributable interest" is too stringent. The Commission could permit a licensee to have a significant investment in another licensee without raising significantly the likelihood of anticompetitive behavior among licensees.

The second major issue on which the Commission solicits comment and that we address is the wide variety of engineering, use, and buildout requirements that the Commission proposes to impose on licensees. We conclude that the Commission need not be concerned that licenses acquired at auction will not be used in ways that advance the interests of consumers, and that instead rules on use of those licenses are necessary to ensure this result. We conclude that the

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<sup>3</sup> As discussed below, if the Commission instead adopted WinStar's proposal to license the spectrum for MTA rather than BTA service areas, the most likely impact, if any, would be to expand the relevant geographic market, which in turn would likely reduce market concentration even further. A wider geographic market would not reduce and would, to the contrary, probably increase the number of competing suppliers.

Commission can rely on market forces—the rivalry among licensees and “wireline” suppliers—to ensure that the spectrum is used in the most efficient way possible, i.e., in a way that best serves the interests of end-users and consumers. A failure to respond to the demands of customers in the most cost-effective way will impose profit penalties on these less efficient competitors. To avoid those penalties, those competitors will be forced to become more efficient. Alternatively, other more efficient entities will be willing to pay the inefficient licensee a sum for the license that exceeds the value of the license to it.

If the Commission were to impose engineering, buildout, and use requirements on licensees, particularly at this early stage in the development of millimeter wave technology, the reduction in the licensee’s ability to experiment with different combinations of services and technologies would impair the discovery of the mix of services and equipment that best satisfies end-user demands at the lowest possible cost. The result will be higher costs to end-users, a lag in the introduction of new services, and lower revenues from the auction. Thus, the imposition of these requirements on licensees would not advance the interests of end-users and might well harm them.

The third and last major issue addressed is the Commission’s proposal to reclaim and auction the “idle” spectrum of incumbent licensees in the 39 GHz portion of the 37-40 GHz band. We conclude that this proposal is in fact likely to result in significant consumer harm. First, spectrum reclamation and a subsequent auction will not increase the consumer benefits from the use of this spectrum. Regardless of how the initial licensees acquired the spectrum, those licensees have every incentive to maximize the profits from their licenses. They will do so either by developing the spectrum themselves (individually or in conjunction with other partners) or selling that spectrum to a more efficient developer. In this way, market forces tend to ensure that the ultimate licensees of the spectrum are those that will use the spectrum most profitably, regardless of who the initial licensees were. Second, spectrum reclamation is likely to harm consumers. In the short run, while awaiting the Commission’s reclamation decision, incumbent

licensees will find it difficult to market their services to new customers and to convince existing customers to expand their purchases. As a result of this short-run delay in the expansion of the supply of these services, their prices will not fall as far as they otherwise would have. Even small price effects may lead to foregoing large absolute dollar savings.

In the longer run, spectrum reclamation will discourage the development and use of fallow or underutilized spectrum. Finding new and innovative ways of using spectrum requires the expenditure of significant sunk costs. These costs include investments in the production of engineering and marketing information to determine whether the use of this spectrum could be a “business,” and the necessary expenditure of funds to convince the Commission that the license award is in the “public interest.” Significantly, many of the development costs will be incurred only by the initial developers and not by subsequent licensees who can “free ride” on the efforts of the initial developers. The problem for the spectrum developer is to recover the sunk costs before imitation becomes too widespread.

If the Commission reclaims some or much of the spectrum of the incumbent 39 GHz licensees at this early stage in the development of the 37-40 GHz spectrum, potential developers of other spectrum bands will fear that, once they have rendered the spectrum more useful and thereby increased its value, the Commission will then decide that it was a “mistake” to “give away” the spectrum through the administrative process. Spectrum developers will fear that they might not be able to recover their sunk costs before the reclamation. In this way, spectrum reclamation will provide licensees with an increased incentive to be “second” but not “first” with a spectrum innovation because the sunk cost expenditure is likely to be far less for the imitators than the developers. As a result, the Commission will discourage spectrum development and deny consumers the benefits of innovation in spectrum uses.

Finally, if the Commission nonetheless chooses to distinguish between “responsible” incumbent 39 GHz licensees and others, we would urge the Commission to adopt very lenient criteria to define this distinction. It is important that the Commission minimize the reclamation

of spectrum for licensees who have sunk costs in the development of that spectrum—regardless of the precise activity in which the licensees have chosen to invest. By so doing, the Commission will reduce the risk of mistakenly reclaiming the spectrum of a “responsible” licensee and thereby reduce the costs of spectrum reclamation. The criterion proposed in the *Notice*—the number of operational links—is only one of many productive investments licensees may have made, and thus by itself is likely to be a poor measure of licensee “responsibility.”

The basis for each of these conclusions is detailed below.

## **II. Spectrum Caps for the 37 to 40 GHz Bands: An Antitrust Analysis**

This section of the paper presents an antitrust analysis of the supply of services likely to be provided by licensees in the 37-40 GHz band. The Commission’s *Notice* requests comment on whether it should impose a cap on the spectrum that a licensee may aggregate in the 37-40 GHz band.<sup>4</sup> Evaluating the economic implications of a spectrum cap requires an antitrust analysis including, as the Commission recognizes, a definition of the relevant product and geographic markets within which licensees would compete. An overall analysis should, however, consider a number of issues beyond the structural conditions of market definition and concentration. The analysis presented here, therefore, discusses a full range of relevant antitrust issues. It reviews the basic principles of antitrust analysis that are relevant (sections A and B), considers the appropriate definitions of product and geographic markets (section C), reviews standards for evaluating the extent of market concentration (section D), analyzes the likely market structure and level of market concentration under various proposed spectrum caps (section E), reviews other factors affecting the level of market competition (section F), and sums up the policy implications of the analysis (section G).

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<sup>4</sup> *Notice* at ¶112.

## **A. The Role of Competition**

Underlying antitrust analysis is a basic policy commitment to rely on competition where possible. When firms compete, prices are driven toward costs, society's resources are efficiently allocated among the various goods and services that can be produced, and consumers must pay no more than necessary to secure these products. Moreover, firms in competitive markets are under continuing pressure to adopt new products, services, technologies, and cost-reducing innovations, whose benefits are passed on to consumers.<sup>5</sup> When firms do not compete, the principal fears are that prices will rise above costs, resources will be inefficiently allocated, and income will be transferred from consumers to producers.<sup>6</sup>

The analyses that identify these benefits of competition typically begin with an idealized market in which there is a large number of firms, each selling a homogeneous or relatively undifferentiated product, and where the entry or exit of firms is either free or easy. In such a setting, no single firm or group of firms has the ability to raise price above cost. No single firm can raise prices to consumers without rapidly losing sales to rivals, either existing firms or new entrants, and there are so many competitors that no group of them successfully can coordinate their behavior, either tacitly or overtly, to raise prices above competitive levels. Moreover, in markets with many competitors, firms are under constant pressure to offer consumers a wide range of products and/or services, or else face the threat that rival firms or new entrants will do so. Finally, firms in competitive markets are driven to introduce cost-reducing technologies in order to avoid being placed at a cost disadvantage relative to their rivals.

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<sup>5</sup>For a discussion of the benefits of competition, and the harm associated with monopoly, see F.M. Scherer and D. Ross, Industrial Market Structure and Economic Performance, Third Edition (Boston: Houghton Mifflin, 1990), pp. 18-29.

<sup>6</sup>We recognize that the Commission is also concerned with diversity of ideas and diversity of ownership. Our focus is solely on the economic effects of competition in the provision of telecommunications services, since issues of diversity of ideas do not arise here. We do not address the issue of ownership diversity.

In many real-world markets, the number of rivals is smaller than that identified in the textbook treatment of competition. It does not follow, however, that economic policy should attempt to maintain a market structure with a very large number of firms by preventing mergers or (in this case) by limiting the number of licenses any single entity can own in a market. For one thing, this might involve the sacrifice of significant cost savings from exploiting economies of scale and scope. Moreover, most economists believe that many of the desirable outcomes resulting from market structures in which there are large numbers of firms can be achieved even if the number of firms in a market falls short of the competitive ideal. In practice, the ability of an individual firm or group of firms to raise prices is limited by a wide variety of factors. A single firm must have a large share of a market before it can unilaterally raise prices. And even in markets where there are relatively few firms, coordination of behavior to raise prices is often very difficult. Thus, while economists generally believe that the likelihood of noncompetitive, coordinated behavior is limited when the number of firms is relatively large, markets may behave very competitively even when they are composed of only a few firms and concentration is relatively high.

Evaluating the extent of competition in markets composed of only a few firms is challenging. There is no single, easily applied rule for assessing the extent of competition, or of determining how far market performance departs from the competitive ideal. To enforce the merger provisions of the antitrust laws, the Federal Trade Commission and the Antitrust Division of the Department of Justice have developed a particular methodology to evaluate whether a specific merger (or acquisition of assets) is likely substantially to lessen competition.<sup>7</sup> At its most basic level, these agencies use this methodology to evaluate whether any particular consolidation will result in higher prices to any customers. The general approach of the Merger

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<sup>7</sup>“Department of Justice and Federal Trade Commission Horizontal Merger Guidelines,” April 2, 1992, Bureau of National Affairs, Special Supplement. [Hereinafter “Merger Guidelines” or “Guidelines.”]

Guidelines is useful for identifying and analyzing competitive issues, and the analysis below uses it to identify and analyze the issues the Commission should address in evaluating the competitive effects of the common ownership of multiple licenses in the 37-40 GHz band. As discussed in greater detail below, the Guidelines are designed for the specific purpose of evaluating mergers. Some of the specifics and standards of the Merger Guidelines are better suited for this purpose, than for the particular policy issues facing the Commission in this *Notice*. The Guidelines describe the kinds of ownership *changes* that could lead to an antitrust challenge by the Justice Department. They do not describe the circumstances under which the Department would challenge the entire pre-existing market environment that provides the context for ownership change. By contrast, the Commission's decisions in this rulemaking will play a large role in shaping an initial market environment that in other industries would largely be shaped by market forces, not regulatory decisions. The Guidelines therefore should not be applied mechanically and without adaptation to the policy issues raised in the rulemaking.

The array of factors that must be taken into account in determining whether or not competition prevails in a market, and whether or not competition may diminish as a result of a reduction in the number of competitors, is quite broad. The analysis typically begins by defining the relevant product and geographic markets, and then evaluating the market's structure, principally the number and size distribution of competing firms. The key concern in focusing attention on these features of market structure is that, as the number of firms is reduced, the probability that the remaining firms can raise prices to consumers may be increased.

The analysis, however, does not stop there. Close consideration also is given to conditions of entry by new competitors and expansion by existing ones, as well as to a variety of other factors that influence the conduct of firms. For example, even in markets that are relatively concentrated, if incumbent firms have the ability to expand, or new competitors can enter the market rapidly, firms will be unable for long to maintain prices at supracompetitive levels.

If expansion or entry is easy and will occur rapidly in the face of high prices, high levels of concentration may still be consistent with competitive market performance. Moreover, even when market concentration is relatively high, firms may be unable effectively to coordinate their behavior and raise prices to consumers. Attempts by firms jointly to raise and sustain prices above competitive levels are limited by many factors, such as cost differences among them, differences in the range of products offered, rapid technical change in both products and services, and rapid market growth.<sup>8</sup>

If market conditions are changing rapidly, and are expected to continue to change rapidly in the future, the very fact of this market dynamism may prevent firms from coordinating their behavior and raising prices. In such circumstances, which appear present in the use of the 37-40 GHz spectrum, even high levels of concentration may not result in anticompetitive outcomes.

Analysis of the competitive consequences of changes in market structure — reductions in the number of firms and increases in concentration — proceeds in the following manner:<sup>9</sup>

- Market Definition and the Identity of Competitors. The relevant product and geographic markets within which the firms compete are defined, and the firms that compete in those markets are identified.
- Number of Competitors and Concentration. Within the relevant markets, the number of firms and levels of market concentration are summarized and evaluated by the computation of summary statistics, including the Herfindahl-Hirschman Index (HHI). If the concentration numbers are low by generally accepted standards, there is a presumption that competition prevails, and that changes in concentration pose no material threat that competition will be harmed by a reduction in the number of competitors.

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<sup>8</sup>Lawrence J. White ("Antitrust and Merger Policy: A Review and Critique," Journal of Economic Perspectives (Fall 1987), pp. 17-18) discusses some of the "other market characteristics" that are taken into account in the Guidelines.

<sup>9</sup>This description is patterned on the analysis outlined by the Merger Guidelines.

- Expansion and Entry. The ease with which existing firms may expand or new firms enter a market is evaluated. Even when market concentration exceeds generally accepted levels, the ability of existing firms to expand or new firms to enter may undercut the ability of existing firms to raise prices above competitive levels.
- Factors Inhibiting Coordinated Behavior. Factors that limit collusive behavior are assessed. When market concentration exceeds generally accepted levels, the ability of firms to coordinate behavior and raise prices above competitive levels may be inhibited by a large number of market characteristics. For example, sustained and rapid change in supply or demand, or both, may effectively prevent coordinated market behavior.
- Efficiencies. Economies of scale or scope that result when firms are combined are examined. Even where the risk of coordinated behavior is enhanced through merger, this factor must be weighed against the associated cost savings. Economies may result from increasing the output of the same product within a single firm (scale), or from combining the production of two or more products in a single firm (scope), or both. If these efficiencies are sufficiently great, they may more than compensate for the additional risk created by increased concentration.

We generally follow this approach in describing the issues the Commission should address in evaluating the likely competitive effects of multiple-license ownership on competition. We do not, however, analyze efficiencies that might result from multiple license ownership. Efficiencies are considered under the Guidelines only as a factor that could offset anticompetitive risks created by a merger. Since, as discussed below, we conclude that multiple license ownership creates little risk of anticompetitive outcomes, it is not necessary to consider efficiencies in any detail. If markets are competitive, the presumption is that the profit-driven decisions of licensees will result in efficient outcomes for consumers and end-users.

## **B. The Principles of Market Definition**

As briefly noted above, the basic question the Commission should ask is whether multiple-license ownership in the 37-40 GHz band will lead to a rise in prices to any consumers. Thus, at the outset, answering this question requires information on the services being provided

by the licensee, the existing options to which consumers can turn in the event of a price increase, and the likely entry of new suppliers in response to a price increase.<sup>10</sup> If the existing consumer options are substantial enough and/or if the price increase would induce the entry of enough new customer options, then multiple-license ownership is unlikely to have adverse competitive effects.

The conventional starting point for answering this question using the Merger Guidelines' methodology is to define the relevant product and geographic markets in which 37-40 GHz licensees will operate. Market shares and concentration typically have relevance as indicators of competition only within economically meaningful markets. A predicate, therefore, to assessing the competitive significance of shares and concentration is identification of the relevant product and geographic markets within which licensees will compete.

### *1. Basic Principles*

Defining the product and geographic markets in which 37-40 GHz licensees will provide services requires identification of the group of firms that determine the price of a specific service or group of services, and specification of the geographic regions within which prices are determined. Market definition precedes an analysis of how competition may be affected by the industry's market structure, or by a reduction in the number of competitors, or by an increase in concentration.

The Merger Guidelines provide a generally sound methodology for defining relevant product and geographic markets, and for identifying the competitors within those markets.<sup>11</sup> Basically, the Merger Guidelines pose a series of hypothetical questions, the purpose of which is

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<sup>10</sup> Franklin M. Fisher, "Diagnosing Monopoly," Quarterly Review of Economics and Business, 19, Summer 1979, reprinted in Industrial Organization, Economics, and the Law, John Monz (ed.), Cambridge, MA: MIT Press, 1991.

<sup>11</sup> §§ 1.1, 1.2, and 1.3 of the Merger Guidelines describe basic principles of market definition and identification of market competitors.

to identify the narrowest group of products, and the smallest geographic region, within which sellers profitably could raise prices by a small but significant and non-transitory amount. In assessing market definition, one does not consider the identity of current sellers. One simply asks whether, if a hypothetical monopolist raised the price of a product sold within a specific geographic region, that price increase would be profitable. If the hypothetical price increase would not be profitable, the implication is that many consumers must either have shifted their purchases to other substitute products, or to the purchase of the same products sold by firms in other geographic regions. If enough consumers switch to competing products so that the hypothetical price increase is unprofitable, then the market must be expanded to include those other products; the relevant product market is broader than, and includes more products than, the tentative antitrust market. Similarly, if the price of a product sold in a specific region is raised but consumers switch their purchases to sellers in some other region, then the geographic market must be expanded to include these other suppliers. One has successfully identified the relevant product and geographic market only when the hypothetical price increase is profitable.

We can illustrate these principles with an example. Assume that there was a proposed merger between the only two Ford automobile dealerships in Alexandria, Virginia. Evaluating market definition would begin by posing the question of whether the merged firm profitably could raise the price of Ford automobiles sold in Alexandria. If, after raising the price, the Ford dealer found that it lost significant sales to other vehicle brands (Chevrolets or Hondas, for example) sold by dealers in Alexandria, so that the price increase was not profitable, the dealer would be forced to rescind the increase to counteract the loss in sales. One would conclude that the product market was broader than just Ford dealerships.

The Ford dealership in Alexandria might also lose sales to Ford dealerships in Arlington. If a sufficient number of buyers shifted to Ford dealers located outside of Alexandria so that the price increase was not profitable, then the geographic market would be broader than Alexandria, and would also include sellers in other regions.

To define the relevant product and geographic market, one would continue to add competing automobile brands and sellers in adjacent regions until the smallest group of firms that sold the product in the narrowest region that could profitably raise the price was identified.<sup>12</sup> In the example above, the relevant market might be the dealerships for some broad class of automobiles (all small and mid-sized cars, for example) in the entire Washington metropolitan area. The key issue in this, or any, market definition analysis is to identify the full range of sellers that might prevent the hypothetical monopolist from raising prices. If such constraints on pricing exist, the market is broader than originally proposed.

Note that the identification of the relevant product and geographic markets described above is based solely on the reaction of *consumers* to an assumed increase in price. These reactions determine what products (or services) and what supply locations should be counted as the relevant product and geographic markets. Firms supplying these products within the geographic market are counted as supplying the relevant market. Other competing firms, however, also may be counted as suppliers to this market because they could begin supplying a relevant product rapidly, even though they do not do so now. Under the Merger Guidelines, if, in the face of a price increase, a firm that does not currently produce and sell a product would likely begin to do so at low costs and within one year, then it is “in the market.” If a firm is in a market through such supply response, then its capacity must be taken into account in evaluating the number of firms and market shares.

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<sup>12</sup>Because of “chain reaction” effects, an analysis that begins by considering a limited set of products, or a narrow geographic region, may end up identifying broad product and/or geographic markets. For example, assume that the analysis above found that Alexandria could not be a relevant geographic market, and that the market had also to include Arlington. In the next round of analysis, one would hypothesize a price increase by auto dealers in both Alexandria and Arlington. That analysis might find that significant sales were lost to dealerships in Montgomery County. Thus, even though Alexandria, the locale of the merging firms, does not border Montgomery County, the two regions could be in the same relevant geographic market.

More technically, to be counted in the market, a firm must be able to begin selling the product within one year and be able to switch its capacity to the production of that product without incurring significant sunk costs.<sup>13</sup> Sunk costs are costs that cannot be recovered if the firm subsequently decides to exit the business. Formally, the Merger Guidelines define markets solely on the basis of shifts in consumer demand. Firms that can enter a market rapidly, through supply-side flexibility and expansion, are taken into consideration in identifying the firms that participate in the market.

Continuing the example above, assume that, in evaluating only changes in demand, we found that the sale of Ford automobiles in metropolitan Washington constituted a relevant market (contrary to the common-sense notion that would have Fords competing with other brands). However, if other existing auto dealerships (that sold Hondas, for example) could begin selling Ford vehicles within one year without great cost, then those potential competitors would also be in the market, participating through supply responses. Thus, even if there were only a few Ford dealers at the date of a merger if other auto dealerships could rapidly and inexpensively begin selling Fords, those firms would also be included in the evaluation of market shares and concentration.

## **2. Price Discrimination and Market Definition**

Under a Merger Guidelines analysis of relevant markets, the objective is to identify the smallest group of products and the narrowest geographic region in which a small price increase by a hypothetical monopolist would be profitable. However, even when a price increase imposed on all customers of a product would not be profitable, if sellers can identify and raise prices to a more narrow or limited class of customers that cannot substitute away from the

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<sup>13</sup>See Merger Guidelines, ¶ 1.32. Such participants are described as “uncommitted entrants.” Entry that requires more than one year and/or involves substantial sunk costs also is relevant for competitive analysis, but is considered separately in evaluating barriers to entry. See Merger Guidelines, ¶ 3.

purchase of a particular product, the sale of that product to that specific group may be a relevant market. The ability to engage in price discrimination (price differences to different customers not justified by cost differences) may allow firms profitably to raise prices to a specific group of customers, e.g., small businesses in some region, or to all customers in a narrow geographic area. If this occurs, then such price discrimination may result in relevant antitrust product markets that are narrower than would be the case if the sellers were required, either by competition or regulation, to charge the same price to all customers. In general, the greater latitude that suppliers have to charge different prices to different customers (either across products or regions), the narrower the relevant market. Price discrimination may thus affect the definition of both product and geographic markets.<sup>14</sup>

### **C. Market Definition in the 37 to 40 GHz Band**

This section examines first an appropriate product and geographic market definition for services offered in the 37-40 GHz band. Product market definition is analyzed by first describing the types of services likely to be offered by firms with 37-40 GHz band licenses. We then consider whether the product market should be extended to include services utilizing other spectrum or non-spectrum-based services. This plan of analysis also broadly fits the Merger Guidelines approach of beginning with the narrow set of services supplied by firms whose competitiveness is being evaluated — here services offered with the 37-40 GHz spectrum — and then asking if the product market must be broadened because other substitutes — here services using other spectrum and non-spectrum-based technologies — would prevent a hypothetical monopolist from exercising market power.

This analysis immediately confronts a complication. There usually is little difficulty specifying what products or services are supplied at what prices by two merging firms. Here,

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<sup>14</sup>The Merger Guidelines address this issue at ¶¶ 1.12 (price discrimination in product market definition) and 1.22 (price discrimination in geographic market definition).

however, firms are just beginning to offer service in the 39 GHz portion of this band. Consequently, there is considerable uncertainty about what services will be supplied at what cost and prices by licensees in the 37-40 GHz band. There is equal, or even greater uncertainty about the nature and cost of services that may be offered with some other millimeter or nearby spectrum. Obviously this complicates an analysis of whether spectrum in the 37-40 GHz band, spectrum in other bands, and cable, copper, or fiber alternatives are good substitutes.

This uncertainty has two immediate consequences for our analysis. First, it leads us to give more attention to supply responses in defining markets. As noted above, the Merger Guidelines employ only demand-side factors in defining antitrust markets, introducing supply-side substitution only later to determine firms who might participate as suppliers, although they do not do so now. The clean distinction between current suppliers of particular products and firms who could supply those products as a result of supply substitution is difficult to draw when most firms have not yet chosen what services they will supply. As a result we give more consideration to supply responses in defining markets. We consider both supply alternatives open to licensees in various spectrum bands in making their initial choices of services to offer, and the possibilities for later shifting the services they supply — the classic concept of supply substitution.

The second consequence of uncertainty is that firm conclusions about market definition become difficult. This section identifies the leading contenders for close substitutes for service at 37-40 GHz, and the conditions under which the product market should or should not be expanded to include these other services. We also review the evidence we have to determine whether it is more consistent with a narrower or broader product market definition.

### 1. Services in the 37 to 40 GHz Band

The FCC's rules and proposed rules give a general indication of the services that may be offered. The entire band will be licensed for fixed point-to-point microwave operations.<sup>15</sup> The Commission already has established rules for such operations in the 39 GHz portion of the band, although the amendment of some of the licensing and technical rules is being reconsidered in this proceeding. The Commission's *Notice* in this proceeding proposes both a channeling plan and licensing and technical rules for fixed point-to-point operations in the 37 GHz portion of the band. The Commission has proposed to harmonize many rules for the 37-40 GHz band as a whole, and has proposed that the bulk of the spectrum in this band would have the same channeling plan: paired 50 MHz channels with a 700 megahertz separation between transmit and receive channels.<sup>16</sup> This uniform channel plan, and the proximity of the spectrum, suggests that the same services will or could be provided throughout the band using essentially the same equipment. The balance of our market analysis assumes that essentially the same services will or could be offered throughout the 37-40 GHz band, as the Commission appears to presume.<sup>17</sup>

WinStar has been one of the first firms to develop commercial services to offer in the 37-40 GHz band. Its services are still in a relatively early stage of development, but the services that WinStar either offers or plans to offer provide some guidance about at least some types of services that may be offered in this band. We understand that among the types of applications and customers WinStar either now serves, or expects to be able to serve, are the following:<sup>18</sup>

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<sup>15</sup> As noted below, the Commission has sought comment on whether a wider range of services, such as point-to-multipoint systems also should be allowed. See *Notice*, ¶13.

<sup>16</sup> See *Notice*, ¶13. The Commission also proposes establishing four unpaired 50 MHz channels in the 37 GHz portion of the band. It also has requested comment on an alternate plan that provides for channels of varying size.

<sup>17</sup> As discussed below, this assumption will be correct if the Commission does not adopt rules that constrain the ability of licensees to offer the same services in both bands.

<sup>18</sup> Based on information from and conversations with WinStar personnel.

- Long distance companies could use 37-40 GHz service to connect call termination or origination points to their own points-of-presence;
- CAPs, or perhaps LECs, could use 37-40 GHz service to connect customers to their fiber rings, or to extend the reach of their fiber networks;
- Businesses, government agencies and other institutions with multiple locations could use 37-40 GHz service in private networks, including connections between LANs and WANs, and telecommunications interconnections among a “campus” of distinct buildings including WAN and LAN applications;
- Providers of mobile services could use 37-40 GHz service for backbone network traffic between and among cell sites, repeaters, MTSOs, and the wired local network;
- Customers could use 37-40 GHz service for wireless local loops as an alternative to the LEC (or perhaps another supplier);
- Customers could use the 37-40 GHz service for access to the Internet; and
- Cable operators could use the 37-40 GHz service as a way of extending their headend to more remote locations.

Still other potential services (including video services, mobile services, and others) may depend on future developments in technology or in demands.<sup>19</sup> For example, we understand that WinStar thinks it may be possible to serve customized demands for interactive transmission at 37-40 GHz. More generally, we understand that technological developments are expected to increase the capacity of individual links, increasing the range of services and applications that can be provided.

None of these services or applications on their face appear to be substantial departures from services readily available with other spectrum or technologies. Most involve the simple provision of circuit capacity for moving voice or data messages over a fixed path between two fixed end points.<sup>20</sup> The technology now used by WinStar provides up to four T-1s of capacity on

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<sup>19</sup> The services offered also may depend on the rules adopted by the Commission concerning such matters as whether point-to-multipoint services are allowed and restrictions on antenna patterns.

<sup>20</sup> We concentrate our analysis on the fixed point-to-point transmission of communications since this is the most certain, and likely the most important, use of the 37 and 39 GHz bands.

each installed link, and in the first quarter of 1996, technology will be available to provide up to DS-3 capacity on each link.<sup>21</sup> As this suggests, the specifications of WinStar's service do not depart from the specifications of other, readily available services. In other words, the main innovation foreseen here is developing the ability to supply these services in the 37-40 GHz band, not designing services with new and sharply different characteristics from those generally available. This of course is valuable; productive capacity is increased to keep pace with growing demand, and additional competition is created for suppliers using other spectrum or technologies. This suggests, however, that consumers will have substantial spectrum and non-spectrum alternatives for services offered in the 37-40 GHz band. In the next two sections, we look more closely at the substitution alternatives, first from other spectrum-based services, then from non-spectrum-based services, and develop the implications for market definition.

## *2. Spectrum Alternatives*

Microwave transmissions have been an important means of supplying dedicated circuit capacity for several decades. Over the years the FCC has allocated substantial spectrum in several different bands for fixed point-to-point communications by both common carriers and private users. The 37-40 GHz band adds to the spectrum available to supply fixed, point-to-point circuit capacity. If circuit capacity supplied using other spectrum can be used to satisfy the same demands at comparable cost, then that capacity should be a good substitute for dedicated circuits using 37-40 GHz spectrum. That in turn suggests the other spectrum is a good substitute for 37-40 GHz spectrum since both can be used to produce substitutable services.<sup>22</sup> A hypothetical monopolist that controlled all 37-40 GHz spectrum would not find it profitable to raise price if it caused enough consumers to turn to circuits provided in these other bands. In

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<sup>21</sup> Based on information provided by and conversations with WinStar personnel.

<sup>22</sup> This would not imply that the allocation of additional spectrum is unnecessary or not beneficial. The issue here is whether consumers would substitute alternatives if supply were artificially constrained in an effort to exercise market power.

that case, service supplied with 37-40 GHz spectrum would not be a distinct product market. We next describe the conditions under which services supplied using other spectrum should be included in the same product market, and analyze whether these conditions are satisfied.

*Absence of Legal or Regulatory Restrictions on Spectrum Use*

The first condition for expanding the product market is that there are no legal or regulatory restrictions on uses of other spectrum that prevent it from being used to provide service that would substitute for service at 37-40 GHz. The licensee must be able either to devote unused spectrum to substitutable service, or to shift from providing another service to providing a substitutable service, in order to provide an alternative to service at 37-40 GHz.

Commission rules do not appear to prevent the supply of substitutable service on substantial amounts of other spectrum allocated to fixed point-to-point service. A total of 4.4 GHz is allocated to fixed point-to-point service in the 18 GHz and 23 GHz bands, and we understand that FCC rules would not prevent their use to supply substitutable services. The Commission recently has proposed rules under which 28 GHz spectrum could be licensed and used. The Commission proposes to allocate 1 GHz to an LMDS service, and to allow LMDS licensees substantial flexibility in the services they could provide. Among the types of services that have been proposed, and that would be possible under proposed rules, are services generally similar to those offered by WinStar.<sup>23</sup>

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<sup>23</sup> Proposed uses also include broadband video distribution and broadband video telecommunications. See *Third Notice of Proposed Rulemaking and Supplemental Tentative Decision In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services and Suite 12 Petition for Pioneer's Preference*, CC Docket No. 92-297 (released July 28, 1995), ¶¶92-93. The Commission has also proposed to modify the licenses of CMRS licensees to permit them to provide wireless local loops and other fixed services as well as mobile services. Thus, some or all of this spectrum may be used to provide services similar to those produced using the 37-40 GHz band. See *Notice of Proposed Rule Making In the Matter of Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services*, WT Docket No. 96-6 (Released January 25, 1996).

In another proceeding the FCC is proposing to allocate and establish rules for above 40 GHz spectrum. In the first *Notice of Proposed Rule Making* in this docket the Commission proposes allocating a total of 6.3 GHz to licensed services, including the 40.5-42.5 GHz and 47.4-48.2 GHz bands. The Commission proposes to allow licensees wide flexibility in their use of this spectrum, noting that among the services for which it expects the spectrum might be valuable are "fixed point-to-point and point-to-multipoint services for video, voice and data transmission..."<sup>24</sup> Thus, the proposed rules would permit license holders in this band to provide services that are substitutable with those using the 37-40 GHz band.

Finally, if the supply of substitutable services were prevented by existing or proposed rules, the Commission itself could act to create greater flexibility in spectrum use, and thereby allow increased competition, by either modifying appropriately existing licenses or by allocating additional spectrum to these services. Setting or revising rules, and modifying licenses where necessary, to expand competition between licensees in different spectrum bands would be consistent with recent Commission policy. The Commission defined PCS broadly, ensuring there would be no legal limitations on competition between PCS and other mobile services. It also modified the licenses of cellular operators to permit them to offer PCS, and determined that SMR licensees could compete for PCS customers.<sup>25</sup> More recently, it has proposed further modifications in Commercial Mobile Radio Service (CMRS) licenses to allow competition by cellular, PCS, and SMR licensees with fixed wireline services.<sup>26</sup>

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<sup>24</sup> *Notice of Proposed Rule Making In the Matter of Amendment of Parts 2 and 15 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications*, ET Docket No. 94-124, RM-8308 (released November 8, 1994), ¶¶20-23.

<sup>25</sup> See *Second Report and Order In the Matter of Amendment of the Commission's Rules to Establish New Personal Communications Services*, GEN Docket No. 90-314, RM-7140, RM-7175, RM-7618, ¶¶19-24.

<sup>26</sup> *Notice of Proposed Rule Making In the Matter of Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services*, WT Docket No. 96-6 (Released January 25, 1996).

### *Spectrum Fungibility*

The second condition for broadening the product market to include service offered at other spectrum bands is that those other portions of the electromagnetic spectrum can be used for services similar in characteristics and cost to those offered at 37-40 GHz. The criterion for “similar” here is that consumers will substitute one service for another in response to small changes in price. If this condition is satisfied, an attempt on the part of any licensee of 37-40 GHz spectrum to raise the price of a service would induce consumers to seek the substitute service, which in turn would induce licensees of other spectrum to devote a portion of their capacity to the provision of that service. The effect would be to make the attempted price increase of 37-40 GHz service unprofitable, and therefore to constrain the attempted increase.

For convenience, service at 37-40 GHz has been referred to as if it were a single type of service or, if several types of service were offered, as if all had the same substitution possibilities. If, however, different portions of the spectrum were especially well-suited to supplying substitutes for different services offered at 37-40 GHz and if a hypothetical monopolist of the 37-40 GHz band could discriminate among users with more and fewer alternatives, then it would be appropriate to define separate product markets for these services. For example, assume that both point-to-point two-way data services and point-to-multipoint broadband video services are offered at 37-40 GHz. Further assume that substitutable video services are or could be supplied at 28 GHz but not other bands, while substitutable two-way data services are or could be supplied at 18 and 23 GHz. Then data services at 18 and 23 GHz would be in the same product market as data services at 37-40 GHz, while video services at 28 GHz and the 37-40 GHz band would be in a different product market.<sup>27</sup>

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<sup>27</sup> While this hypothetical is limited to particular spectrum alternatives, a complete analysis also would consider whether non-spectrum alternatives also were in each of these product markets.